hypothesis that its entire mass was originally in a fluid state; an hypothesis which was at first founded on astronomical considerations, and is now corroborated by the discoveries of modern geology, exhibiting the apparent injection from below of large masses of unstratified rocks, through the fissures of sedimentary strata. Assuming that this state of fluidity was the effect of heat, we are led to consider the steps of transition by which the earth has passed into its present state of solidity, and apparently permanent temperature. After adverting to the analytical investigations of Fourier and Poisson on this subject, the author proceeds to inquire into the results of the laws of refrigeration of heated bodies, which may be conceived to operate in the present case; namely, refrigeration by *circulation*, which obtains when the fluidity is perfect, and that by *conduction*, when the particles of the mass, by the diminution of fluidity, no longer retain that mobility among one another which is requisite for their circulation. Thus while, in either case, the superficial parts of the earth would rapidly cool and solidify by the radiation of their heat into sidereal space, forming a crust of small thickness compared with the whole radius of the globe, the internal mass may be in one or other of the three following conditions:—*First*, it may consist of matter still in a state of fusion, of which both the temperature and the fluidity are greatest at the centre, but which has been brought, by the long-continued process of circulation, into a state no longer admitting of this process, and capable, therefore, of cooling only by conduction. *Secondly*, the earth may consist of an external shell, of a central nucleus, rendered solid by the enormous pressure to which it is subjected, and of an intermediate stratum of matter in a state of fusion. The thickness of the shell, as well as the radius of the solid nucleus, may possibly be small compared with the radius of the earth. The fluidity of the intervening mass must necessarily be here, also, considerably more imperfect than that which would just admit of cooling by circulation. *Thirdly*, the earth may be solid from the surface to the centre.

The author then shows that the direct investigation of the manner in which the earth has been cooled, assuming its original fluidity from heat, cannot determine the actual condition of its central parts, not from any imperfection in the analytical process, but from the want of the experimental determination of certain values, which it is extremely difficult, if not impossible, accurately to obtain. It has occurred to the author that a more indirect test of the truth of the hypothesis of the central fluidity of the earth might be found in the delicate but well-defined phenomena of precession and nutation. The investigation of the problems thus suggested is reserved by the author for the subject of a future memoir.

November 30, 1838.

Francis Baily, Esq., V.P. and Treasurer, in the Chair.

At the Anniversary Meeting of the Royal Society, Mr. Galloway,

one of the Auditors of the Treasurer's accounts on the part of the Society, reported that the balance in the hands of the Treasurer was 1463*l.* 14*s.* 5*d.*

The thanks of the Society were voted to the Treasurer for his past services, and to the Auditors for their trouble in auditing his accounts.

The following list of Fellows deceased, and also of Fellows admitted since the last Anniversary, was read:

Deceased since printing the List, November 1837.

Battine, William, LL.D.
Camac, William.
Carrington, Lord.
Carstairs, John.
Catton, Rev. Thomas.
Colebrooke, Sir James Edward, Bart.
Collingwood, G. L. N., Esq.
Cooke, John, M.D.
Earle, Henry.
Eldon, Earl of.
Elford, Sir William.
Farnborough, Charles, Lord.
Hall, Sir John, Bart.
Hoare, Sir Richard C., Bart.
Holford, Robert.
Hume, Sir Abraham, Bart.
Knight, Thomas A., Esq.
Maccaulay, Zachary, Esq.
Morris, George P., M.D.
Nicholl, Rt. Hon. Sir John.
Selsey, Henry J., Lord.
Taunton, Richard, M.D.
Thomson, Sir John D.
Tomline, William Edward, Esq.
Vay de Vaja, Baron Nicholas.
Williams, John L., Esq.
Woolmore, Sir John.

Foreign Members.

Bowditch, Dr. N.
Cuvier, F.
Dulong, P. L.
Marum, M. van.

New Members.

Arnott, Neill, M.D.
Bateman, James, Esq.
Briggs, General John.
Burnet, Rev. Thomas, D.D.
Carnac, Sir James R.
Cureton, Rev. William, M.A.
Denison, William Thomas, Esq., Lt. R.E.
Donkin, Bryan, Esq.
Eastlake, Charles Lock, Esq.
Glynn, Jos., Esq.
Hansler, Sir John.
Hardwick, John, Esq.
Hymers, Rev. John.
Jervis, Major Thomas Best.
Johnson, Rev. George Henry S.
Johnston, John F. W., Esq.
Locke, Jos., Esq.
Macneill, John, Esq.
MacGillivray, Simon, Esq.
Merewether, Rev. John.
Miller, William Hallows, Esq.
Outram, Benjamin F., M.D.
Pereira, Jonathan, Esq.
Porter, George Richardson, Esq.
Reade, Rev. Jos. B., M.A.
Stirling, Edward Hamilton, Esq.
Todd, Robert B., M.D.
Tuson, Edward William, Esq.
Tweedie, Alexander, M.D.
Twiss, Travers, Esq.
Tuscany, Grand Duke of.
Wilson, Alexander, Esq.

Re-elected.

Hay, Colonel Andrew Leith. | Lowe, George, Esq.

It was stated that the report of the death of R. Z. Mudge, Capt. R.E., noticed at the last Anniversary, has been since found to be erroneous.

The following Address of His Royal Highness the President was read from the Chair:

GENTLEMEN,

I CANNOT quit the Chair of the Royal Society, which I have now occupied during a period of eight years, without availing myself of the opportunity which the customary proceedings of the Anniversary afford me, of expressing to you the grateful sense I entertain of the great honour conferred upon me, by being chosen to fill so distinguished an office, as likewise of the uniform kindness and support which I have always received from the Members of the Council and the Fellows of the Society generally, in the discharge of its various and important duties.

A review of my conduct during the period of my Presidency, recalls to my mind many occasions in which I am sensible that I have been more or less wanting in the very responsible trust confided to me, of watching over the interests of a Society most justly illustrious by the succession of great men who have been connected with it and by the great advances which nearly every department of science has received from those portions of their labours which are recorded in its Transactions; for *some* of these deficiencies I am unfortunately enabled to refer to the severe and long continued visitations of disease and infirmity under which I have laboured, as a very sufficient apology; and I feel less oppressed than I otherwise should have been, by my consciousness of many others, by my knowledge of the activity and zeal of the very able and efficient officers upon whom the temporary discharge of my duties devolved, and from the assurance which I felt, that the interests of the Society, when entrusted to their care, would suffer no detriment by my absence.

Though justly proud of the distinction of presiding over the Royal Society, and most anxious to promote, to the utmost of my power, the great objects for which it was founded, I no sooner ascertained that circumstances would probably, for a time, interfere with my residence in London, during a considerable part of its Annual Session, and prevent my receiving its Members in a manner compatible with my rank and position in this country, than I determined to retire from an office whose duties I could no longer flatter myself as likely to be able to discharge in a manner answerable to their expectations, or in accordance with my own feelings. Having come to this conclusion after the most anxious and painful consideration, I deemed it due to the Members of the Council, in the first instance, and next to the Fellows, to make it speedily and generally

known, with the view of enabling them to look out for a proper person to fill a situation of such dignity in the scientific world, and whose occupation could not fail to be an object of honourable ambition to men of the most eminent social rank, as well as of the most distinguished scientific attainments.

I will not attempt to disguise from you, Gentlemen, the feelings of deep and poignant regret I experienced upon taking a step that would thus necessarily abridge the opportunities, which I had as much enjoyed as I had highly prized, of being brought officially into frequent and familiar contact with the most distinguished philosophers of my own or other countries, and of employing whatever influence my station in society enabled me to exert in advocating the just claims and interests of men of science, in promoting the objects of their labours, in fostering and encouraging their mutual co-operation and intercourse, and in endeavouring to soothe the violence of personal or national jealousies, whenever they unfortunately existed, by bringing them together in social or other meetings where the discussion of topics of irritation could be either suppressed or controlled, and where imaginary prejudices would disappear under the softening operation of reciprocal knowledge and experience. But though deprived for a season, by my retirement, of some of the highest privileges I have hitherto exercised and enjoyed, yet I do not abandon the hope of being still able to maintain and cultivate the very valuable and delightful friendships which I have thus fortunately for myself been enabled to form during the period of my connection with you, by seizing every occasion when presented to me, of appearing at the meetings of the Royal Society, and by co-operating with its members, to the utmost extent of my limited means, in furthering those objects that may be considered to be most important for the advancement of the interests of science.

I am afraid however, Gentlemen, that I have already trespassed unreasonably upon your time and attention in endeavouring to explain to you the motives of my conduct, and to express, though most inadequately, my grateful sense of the kindness which I have invariably experienced from you. I shall therefore now proceed to the more immediate subject of this Address, which is to notice some of the most important Proceedings of the Society which have taken place during the last year.

The Address voted to Her Majesty by the President and Council of the Royal Society, on the Queen's accession to the throne, embodying likewise a petition to Her Majesty to become the Patron of the Society, and to continue to it the Grant of the Medals which had been instituted by King George the Fourth and regranted by William the Fourth, as well as the gracious reply of the Sovereign, transmitted through the Secretary of State for the Home Department, have been already communicated to you at one of the weekly meetings of the Society*. On the 20th of June last, the President and Council were summoned to attend at the Palace of

* June 21, 1838.

St. James's to witness Her Majesty's signature in our Charter-Book as Patron of the Society. I availed myself of the occasion thus presented to me to address the Queen in your name, and to assure Her Majesty that we felt bound by the obligations of our Charter, as well as by the recollection of our foundation, to look up to the Sovereign of these realms as our Patron and protector: that we most gratefully acknowledged the assurances which Her Majesty had conveyed to us through Her minister the Secretary of State for the Home Department, of the continuance of the same support and favour as had been always accorded to us by the Sovereigns of this Kingdom, and likewise the signification of Her Majesty's intention of renewing the grant of the two Medals which had been instituted by one and confirmed by another of Her Majesty's royal uncles and predecessors, accompanied by Her gracious permission to propose such modification and amendments in the statutes which had been provided for their distribution, as would tend most effectually to promote the advancement of science, and would most certainly accomplish the liberal and patriotic views and intentions of their Royal Founders. I further ventured to advert to the close connection which exists between the cultivation of Science and the Arts, and the progress and developement of the great elements of the prosperity and happiness of nations, and to express my earnest hope and prayer that the triumphs of the arts of peace and commerce, which had so signally marked the beginning of Her Majesty's reign, might be continued without intermission to its distant conclusion.

The Queen having received the Address in the most gracious manner, was pleased to sign her august and royal name in our Charter-Book as Patron of the Royal Society: after which the officers and different members of the Council were presented by me to Her Majesty, and had the honour of kissing Her Majesty's hand.

The alterations in the laws for the distribution of the Royal Medals, which Her Majesty was graciously pleased to authorize and permit, have been made by a Committee of the Council appointed for that purpose, and have since received the especial sanction and approbation of Her Majesty. They are directed to be given hereafter to such papers, and to such papers only, as have been presented to the Society, or inserted in its Transactions, within three years of the date of the award; and they are to be awarded to departments of science whose order of succession is defined by a cycle of three years, comprising in the first *Astronomy* and *Physiology*, in the second *Physics* and *Geology*, and in the third *Mathematics* and *Chemistry*. And it is further added and commanded, that no departure from this order of succession shall be allowed, unless it shall appear that no memoir of sufficient merit to be entitled to such an honour shall have been presented to the Society within the period afore-named; in which case, and in which case only, it shall be competent for the Council, with the approbation of Her Majesty, to award the Medal to one of those branches

of science which are comprehended in the cycle of the preceding year.

I trust, Gentlemen, that these laws for the distribution of the Royal Medals, if strictly adhered to, and judiciously administered, will be found to stimulate the exertions of men of science, by securing to their labours, when inserted in our Transactions, that certain and periodical revision which they are naturally so anxious to obtain; and by signalizing any remarkable investigation, or notable discovery, by the marked and prompt approbation of those persons in this country who are most likely to be able to judge of its value.

It was partly for the furtherance of the same great object, which was proposed in framing the statutes for the award of the Royal Medals, so as to secure to each branch of science in succession its due amount of notice and encouragement, that the Council have determined to establish permanent Committees of Science. They are composed of a selection of those Fellows of the Society who are known to have devoted their attention, in a more especial manner, to those departments of science to which they are severally assigned, and to whom all questions connected with such branches are proposed to be referred, including the selection of the memoirs to which the Royal Medals shall be given. The Council have thought proper, likewise, in the formation of these committees, to enlarge the number of the sciences, which form the Medallic cycle above referred to, from six to eight, by separating the science of Meteorology from that of Physics, and the science of Botany and the laws of Vegetable Organization and Life, from that of Zoology and Animal Physiology. I sincerely rejoice, Gentlemen, in the adoption of this arrangement, as I think it admirably calculated to give a more marked and specific distinction to those sciences which the Fellows of the Royal Society are bound more especially, by the obligations of the Charter, to cultivate, and as tending, likewise, to bring those persons who are engaged in common pursuits into more frequent intercourse with each other; and thus to afford them increased opportunities of appreciating their mutual labours, of devising new and important trains of investigation, as well as of securing public aid and general co-operation in the accomplishment of objects which are too costly or too vast for individuals to undertake or to attempt.

The future developement of many of the sciences is becoming daily more and more dependent upon co-operative labour. We are rapidly approaching great and comprehensive generalizations, which can only be completely established or disproved by very widely distributed and, in many cases, by absolutely simultaneous observations. Major Sabine has lately collected with great labour, and reduced and analysed with great ability, a vast mass of observations relating to the distribution of the earth's magnetism; and the result has pointed out not merely the proper fields of our future researches, but likewise their great extent and the enormous amount of labour still required for their cultivation. A society on the continent, headed by the justly celebrated Gauss, to whom the Copley Medal has been

this year adjudged for his magnetical researches, my cotemporary and fellow student at Göttingen, has instituted a system of simultaneous observations on the periodical and irregular movements of the magnetic needle at various stations in different parts of Europe, which suggest conclusions of the most surprising and interesting nature; these can only be fully worked out and confirmed by the adoption of a similar system of observations in places extremely remote from each other on the surface of the globe. The researches on the tides, which have been so laboriously and so successfully prosecuted by Professor Whewell and Mr. Lubbock, have led, and can lead to few general and certain conclusions without the aid of labours of this nature; and a memorable exemplification of their value, even when given in their rudest and least perfect form*, is presented in the discovery of the "Law of Storms," which Col. Reid has recently published, and which promises results so important to the interests of navigation and the cause of humanity. In the science of Meteorology, which still remains destitute even of approximations to general laws, it is to a well-organized system of simultaneous observations that we must look for the acquisition of such a knowledge of the range and character of atmospheric influences and changes, as may become the basis of a well-compacted and consistent theory, and rescue this science from the reproach, under which it has too long and too justly laboured, of presenting little more than a confused mass of almost entirely insulated results. Undertakings, however, of this extensive and laborious nature are far beyond the reach of individual enterprize, and can only be accomplished by national aid and co-operation.

We have lately witnessed an example where the Storthing, or National Assembly of Norway, a body composed partly of peasants, and representing one of the poorest countries in Europe, undertook the charge of a magnetical expedition to Siberia, on the recommendation and under the direction of their distinguished countryman, M. Hansteen, at the same time that they refused a grant of money to aid in building a palace for their sovereign; and I feel confident that the united wishes of men of science in this and other countries, whose influence on public opinion is becoming daily more and more manifest, particularly when expressed in favour of purely scientific objects which cannot be effected without the assistance and the resources of the nation, will not be without their effect on the Government of our own country, which has always taken the lead in the promotion of geographical as well as scientific investigations and discoveries, and which possesses, beyond any other nation, advantages for their prosecution and accomplishment, not merely from its superior wealth, but from the range and distribution of its commerce and its colonies in every region of the globe.

There is one other event to which I wish to advert previously to concluding this portion of my address to you, and which I conceive I may do with the strictest propriety, as it is closely connected with

* From the logs of ships.

the general interests of the Royal Society. I allude to the return of Sir John Herschel to this country, after an absence of several years, devoted, from a sense of filial duty, to the completion of that great task which he felt to have been transmitted to him as an inheritance from his venerable and illustrious father. I have so often had occasion to allude, from this Chair, to the merits of that distinguished person, and to express the respect which I felt for his great attainments, the pride with which I cherished his friendship, the deep interest which I took in his labours, and my admiration of the truly modest and philosophical spirit in which they were conducted, that I should be guilty of a very superfluous repetition of what I have before addressed to you, if I ventured to enlarge upon them now; but I should ill discharge my duty, whilst still entitled to address you as the official head of the scientific establishment of this country, if I omitted to avail myself of this or any other opportunity of expressing the gratification which I experienced in June last, when called upon to preside at that great convention of the most eminent men who adorn our country, who combined together with such singular unanimity and enthusiasm to pay their homage to science and knowledge, and those great interests with which their cultivation and progress are connected, by paying so signal a tribute of respect and honour to the most accomplished and the most devoted of our living philosophers. I feel assured, Gentlemen, that the proceedings of that memorable day will produce marked and durable effects upon the scientific prospects of our country, by proving that pre-eminent merit will meet with sympathy at least, if not with reward, and as offering sure and unequivocal indications both of the power and direction of public opinion amongst the most cultivated and enlightened classes of society; and it was chiefly as an expression of the deference paid by the government of this country to the opinions and wishes of the scientific world, that I rejoiced in being authorized and requested by the prime minister of the crown to offer to Sir John Herschel the rank of baronet, on the occasion of the coronation of Her Majesty, though well convinced that such an accession of social rank was not required to give dignity to one whose name is written in the imperishable records of the great system of the universe.

It would ill become me, while gratefully acknowledging my sense of your past kindnesses towards myself, to venture to refer to the name of my presumed successor in the Chair of this Society in any terms which might be interpreted as an undue anticipation of the result of this day's proceedings, or as appearing to interfere with the free use of the franchise which every Fellow possesses, and is expected and required to exercise; but I cannot be ignorant of the various accomplishments, the courteous and unassuming manners, the warmth of heart and active benevolence which distinguish the nobleman who has been nominated by the Council: and I rejoice most sincerely that the Society possesses amongst its members, as a candidate for your suffrages, one so well qualified to preside at your meetings, and to watch over your interests.

Amongst the deceased members, I find twenty-seven on the Home, and four on the Foreign list, including some very considerable names. I shall now proceed to notice such of their number as have been most distinguished for their scientific labours, for their public services, or for their encouragement and patronage of science and the arts.

Thomas Andrew Knight, of Downton Castle, Herefordshire, the President of the Horticultural Society of London, to the establishment and success of which he so greatly contributed, was born in the year 1758. He was educated at Ludlow school, and afterwards became a member of Balliol College, Oxford. From his earliest years he appears to have shown a predominant taste for experimental researches in gardening and vegetable physiology, which the immediate and uncontrolled possession of an ample fortune gave him every opportunity of indulging; proposing to himself in fact, as one of the great objects of his life, to effect improvements in the productions of the vegetable kingdom, by new modes of culture, by the impregnation of different varieties of the same species, and various other expedients, commensurate with those which had already been effected by agriculturists and others in the animal kingdom, by a careful selection of parents, by judicious crossing, and by the avoidance of too close an alliance of breeds. In the year 1795 he contributed to our Transactions his first, and perhaps his most important paper, on the transmission of the diseases of decay and old age of the parent-tree to all its descendants propagated by grafting or layers, being the result of experiments which had already been long continued and very extensively varied, and which developed views of the greatest importance and novelty in the economy of practical gardening, and likewise of very great interest in vegetable physiology. This paper was succeeded by more than twenty others, chiefly written between the years 1799 and 1812, containing the details of his most ingenious and original experimental researches on the ascent and descent of the sap in trees; on the origin and offices of the alburnum and bark; on the phenomena of germination; on the functions of leaves; on the influence of light, and upon many other subjects, constituting a series of facts and of deductions from them, which have exercised the most marked influence upon the progress of our knowledge of this most important department of the laws of vegetable organization and life.

Mr. Knight succeeded Sir Joseph Banks in the presidency of the Horticultural Society, and contributed no fewer than 114 papers to the different volumes of its Transactions: these contributions embrace almost every variety of subject connected with Horticulture; such as the production of new and improved varieties of fruits and vegetables; the adoption of new modes of grafting, planting, and training fruit-trees; the construction of forcing-frames and hot-houses; the economy of bees, and many other questions of practical gardening, presenting the most important results of his very numerous and well-devised experiments.

Mr. Knight was a person of great activity of body and mind,

and of singular perseverance and energy in the pursuit of his favourite science: he was a very lucid and agreeable writer, and it would be difficult to name any other cotemporary author in this or other countries who has made such important additions to our knowledge of horticulture and the economy of vegetation.

Sir Richard Colt Hoare, the owner of the beautiful domain of Stourhead in Wiltshire, was the author of many valuable historical and topographical works, and more especially of the history of his native county, presenting so numerous and such splendid funereal and other monuments of the primitive inhabitants of Great Britain, which he investigated with a perseverance and success unrivalled by any other antiquary. The early possession of an ample fortune and of all the luxuries of his noble residence, seem to have stimulated, rather than checked, the more ardent pursuit of those favourite studies, which occupied his almost exclusive attention for more than fifty years of his life: and he was at all times, both by his co-operation and patronage, ready to aid other labourers in the same field which he had himself cultivated with so much success and industry.

Sir Richard Hoare was a very voluminous original author, and on a great variety of subjects; he printed a catalogue of his unique collection of books relating to the history and topography of Italy, the whole of which he presented to the British Museum, to which he was, on other occasions, a liberal benefactor. He likewise published editions of many of our ancient chronicles; and it is only to be lamented that one who has contributed under so many forms to our knowledge of antiquity, and who presents so many claims to the grateful commemoration of the friends of literature and the arts, should have been influenced so much, and so frequently, by the very unhappy ambition, of which some well-known and distinguished literary bodies of our own time have set so unworthy an example, of giving an artificial value to their publications, by the extreme smallness of the number of copies which they allow to be printed or circulated; thus defeating the very objects of that great invention, whose triumphs were pretended to be the very groundwork of their association.

Mr. George Hibbert was one of the most distinguished of those princely merchants whose knowledge of literature, patronage of the arts, and extensive intercourse with the world have contributed so much, in a great commercial country like our own, to elevate the rank and character of the class to which they belong, and to give to the pursuits of wealth an enlarged and liberalizing spirit. Mr. Hibbert possessed, during the most active period of his life, an uncommon influence amongst the great commercial bodies of the metropolis, and more particularly amongst those connected with the West India trade, from his integrity and high character, his great knowledge of business, his excellent sense and judgement, and his clearness and readiness in public speaking. He was an excellent botanist, and the collection of plants which he had formed at his residence at Clapham, was remarkable not merely for its great extent, but likewise for the great number of extremely rare plants which it con-

tained. He was well known also as a very extensive and judicious collector of books, prints, drawings and paintings, and was endeared to a large circle of private friends, amongst the most cultivated classes of society in this country, by his refined yet simple manners, his happy temper, and his many social and domestic virtues.

Sir Abraham Hume, who had attained at the time of his death the venerable age of ninety years, was the father of the Royal Society; he was a man of cultivated taste and very extensive acquirements, and throughout his life a liberal patron and encourager of the fine arts.

Lord Farnborough was the son-in-law of Sir Abraham Hume, whom he greatly resembled in his tastes and accomplishments; for more than thirty years of his life he held various public situations in the successive administrations of this country, but quitted his official employments on his elevation to the peerage in 1826: from that period he devoted himself almost entirely to the improvement and decoration of his beautiful residence at Bromley Hill; to the proposal and promotion of plans for the architectural improvement of the metropolis; to the selection of pictures for the National Gallery, which he greatly enriched by his bequests; and to the various duties imposed upon him by his official connexion with the British Museum, and many other public institutions.

The Earl of Eldon, though possessing few relations with science or literature, presents too remarkable an example of the openings afforded by the institutions of this country to men of great and commanding talents for the attainment of the highest rank and wealth, to be passed over without notice in this obituary of our deceased Fellows. Lord Eldon was matriculated as a member of University College, Oxford, under the tuition of his brother, afterwards Lord Stowell, in 1766; and an academical prize which he gained in the following year, for an "Essay on the Advantages of Foreign Travel," gave the first evidence of his possession of those great powers of minute analysis and careful research, which made him afterwards so celebrated. His early marriage terminated somewhat prematurely his academical prospects, and forced him to adopt the profession of the law, after narrowly escaping other occupations of a much more humble character. He was compelled to struggle for several years of his life with poverty and discouragement, when a fortunate opportunity enabled him to give proof of his extraordinary attainments, and rapidly conducted him to the command of wealth and professional eminence. After filling with great distinction the offices of Solicitor and Attorney-General, he became Chief-Justice of the Common Pleas and a peer in 1799, and finally Lord Chancellor of England in 1801, a situation which he continued to hold, with a short interruption, for nearly a quarter of a century. Of his political character and conduct it becomes not me to speak; but his profound knowledge of the laws of England, his unrivalled acuteness and sagacity, and his perfect impartiality and love of justice, have received the concurrent acknowledgment and admiration of men of all parties.

The Rev. Thomas Catton, Senior Fellow of St. John's College,

Cambridge, was in early life a schoolfellow of Lord Nelson, of whose talents or character, however, he retained no very vivid impressions: he became a Member of the University in 1777, and when he took his degree in 1781 he was fourth Wrangler and first Smith's Prizeman, a discrepancy in the results of two similar examinations, which is said to have led to the adoption of some regulations preventing their recurrence in future. In the year 1800 he became one of the public tutors of his college, in conjunction with its present venerable and distinguished master, and secured, in a very uncommon degree, the respect and love of his pupils, by his skill and knowledge as a teacher, and by his kind and vigilant attention to their interests: he quitted the tuition in 1810, and for the remainder of his life he devoted himself, almost exclusively, to the cultivation of practical and theoretical astronomy, having succeeded to Mr. Ludlam in the management of the observatory which is placed over one of the interior gateways of the college. He possessed a most accurate knowledge of the theory and use of astronomical instruments, and was a most scrupulous and skilful observer; and he is known to have left behind a very large mass of observations, particularly of occultations, most carefully detailed and recorded. Mr. Catton was a man of very courteous manners and most amiable character, and possessed of a very extensive acquaintance both with literature and science. He died in the month of January last, in the eightieth year of his age, deeply regretted by the members of the college in which he had passed the greatest part of his life.

Mr. Henry Earle, one of the Senior Surgeons of St. Bartholomew's Hospital, was the son of one very eminent surgeon, Sir James Earle, and the grandson of another, Mr. Percival Pott. He was the author of many valuable articles in different medical journals, and likewise of two papers in our Transactions; one detailing the result of a very novel and difficult surgical operation, and the other on the mechanism of the spine, which were published in 1822 and 1823. Mr. Earle was considered to be one of the most skilful and scientific surgeons of his age, and was justly esteemed by his professional and other friends not merely for his great acquirements, but for his kindness of heart and upright and honourable character.

John Lloyd Williams, formerly British resident at Benares, was the author of three short papers in our Transactions in the year 1793; two of them upon the method of making ice at Benares, by means of extremely porous and shallow evaporating pans of unglazed earthenware, placed upon dry straw or sugar-cane; and the last furnishing additional descriptions of the great quadrants and gnomon in the observatory at Benares, which had been described in a paper in our Transactions in 1777 by Sir Robert Barker.

The Foreign Members whom the Society has lost during the last year, are Dr. Nathaniel Bowditch, of Boston, in America; Messieurs Dulong and Frederic Cuvier, of Paris; and Dr. Martin van Marum, of Haarlem.

Dr. Nathaniel Bowditch of Boston, in the State of Massachusetts in America, was born at Salem, in the same State, in 1773: he was

removed from school at the age of ten years to assist his father in his trade as a cooper, and was indebted for all his subsequent acquisitions, including the Latin and some modern languages and a profound knowledge of mathematics and astronomy, entirely to his own exertions unaided by any instruction whatever. He became afterwards a clerk to a ship-chandler, where his taste for astronomy first showed itself, and was sufficiently advanced to enable him to master the rules for the calculation of a lunar eclipse; and his subsequent occupation as supercargo in a merchant vessel sailing from Salem to the East Indies, led naturally to the further developement of his early tastes, by the active and assiduous study of those departments of that great and comprehensive science which are most immediately subservient to the purposes of navigation. It was owing to the reputation which he had thus acquired for his great knowledge of nautical astronomy, that he was employed by the booksellers to revise several successive editions of Hamilton Moore's Practical Navigator, which he afterwards replaced by an original work on the same subject, remarkable for the clearness and conciseness of its rules, for its numerous and comprehensive tables, the greatest part of which he had himself recalculated and reframed, and for its perfectly practical character as a manual of navigation: this work, which has been republished in this country, has been for many years almost exclusively used in the United States of America.

Dr. Bowditch having been early elected a Fellow of the American Academy of Arts and Sciences at Boston, commenced the publication of a series of communications in the Memoirs of that Society, which speedily established his reputation as one of the first astronomers and mathematicians of America, and attracted likewise the favourable notice of men of science in Europe.

During the last twenty years of his life, Dr. Bowditch was employed as the acting president of an Insurance Company at Salem, and latterly also as actuary of the Massachusetts Hospital Life Insurance Company at Boston: the income which he derived from these employments, and from the savings of former years, enabled him to abandon all other and more absorbing engagements, and to devote his leisure hours entirely to scientific pursuits. In 1815 he began his great work, the translation of the *Mécanique Céleste* of Laplace, the fourth and last volume of which was not quite completed at the time of his death. The American Academy over which he presided for many years, at a very early period of the progress of this very extensive and costly undertaking, very liberally offered to defray the expense of printing it; but he preferred to publish it from his own very limited means, and to dedicate it as a splendid and durable monument of his own labours and of the state of science in his country. He died in March last, in the sixty-fifth year of his age, after a life of singular usefulness and most laborious exertion, in the full enjoyment of every honour which his grateful countrymen in every part of America could pay to so distinguished a fellow-citizen.

Dr. Bowditch's translation of the great work of Laplace is a production of much labour and of no ordinary merit: every person who

is acquainted with the original must be aware of the great number of steps in the demonstrations which are left unsupplied, in many cases comprehending the entire processes which connect the enunciation of the propositions with the conclusions, and the constant reference which is made, both tacit and expressed, to results and principles, both analytical and mechanical, which are co-extensive with the entire range of known mathematical science: but in Dr. Bowditch's very elaborate commentary every deficient step is supplied, every suppressed demonstration is introduced, every reference explained and illustrated, and a work which the labours of an ordinary life could hardly master, is rendered accessible to every reader who is acquainted with the principles of the differential and integral calculus, and in possession of even an elementary knowledge of statical and dynamical principles.

When we consider the circumstances of Dr. Bowditch's early life, the obstacles which opposed his progress, the steady perseverance with which he overcame them, and the courage with which he ventured to expose the mysterious treasures of that sealed book, which had hitherto only been approached by those whose way had been cleared for them by a systematic and regular mathematical education, we shall be fully justified in pronouncing him to have been a most remarkable example of the pursuit of knowledge under difficulties, and well worthy of the enthusiastic respect and admiration of his countrymen, whose triumphs in the fields of practical science have fully equalled, if not surpassed, the noblest works of the ancient world.

Pierre Louis Dulong was born at Paris in 1785: he became an orphan at the age of four years; and though hardly possessing the most ordinary advantages of domestic instruction or public education, his premature talents and industry gained him admission at the age of 16 to the Polytechnic School, which has been so fertile in the production of great men, of which he became afterwards successively examiner, professor, and director. He first followed the profession of medicine, which he abandoned on being appointed Professor of Chemistry to the Faculty of Sciences. He became a member of the Institute in 1823, in the Section of the physical sciences. On the death of the elder Cuvier he was appointed Secretaire Perpetuel to the Institute, a situation from which he was afterwards compelled to retire by the pressure of those infirmities which terminated in his death in the fifty-fourth year of his age.

M. Dulong was almost equally distinguished for his profound knowledge of chemistry and of physical philosophy. His "Researches on the mutual decomposition of the soluble and insoluble Salts," form a most important contribution to our knowledge of chemical statics. He was the discoverer of the *hypophosphorous acid*, and also of the *chlorure of azote*, the most dangerous of chemical compounds, and his experiments upon it were prosecuted with a courage nearly allied to rashness, which twice exposed his life to serious danger; and his memoirs on the "Combinations of phosphorus with oxygen," on the "*hyponitric acid*," on the *oxalic acid*,

and other subjects, are sufficient to establish his character as a most ingenious and accurate experimenter, and as a chemical philosopher of the highest order.

But it is to his researches on the "Law of the conduction of heat," "On the specific heat of the gases," and "On the elastic force of steam at high temperatures," that his permanent fame as a philosopher will rest most securely: the first of these inquiries, which were undertaken in conjunction with the late M. Petit, was published in 1817; and presents an admirable example of the combination of well-directed and most laborious and patient experiment with most sagacious and careful induction: these researches terminated, as is well known, in the very important correction of the celebrated law of conduction, which Newton had announced in the Principia, and which Laplace, Poisson, and Fourier had taken as the basis of their beautiful mathematical theories of the propagation of heat. His experiments on the elastic force of steam at high temperatures, and which were full of danger and difficulty, were undertaken at the request of the Institute, and furnish results of the highest practical value; and though the conclusions deduced from his "Researches on the specific heat of gases" have not generally been admitted by chemical and physical philosophers, the memoir which contains them is replete with ingenious and novel speculations, which show a profound knowledge and familiar command of almost every department of physical science.

M. Frederic Cuvier, the younger brother of the illustrious Baron Cuvier, Professor of Animal Physiology to the Museum of Natural History at Paris, and Inspector-general of the University, was born at Montbelliard, in Alsace, in 1773: he had from an early period attached himself to those studies which his brother had cultivated with so much success, and his appointment as keeper of the menagerie at the Jardin des Plantes, furnished him with the most favourable opportunities of studying the habits of animals, and of prosecuting his researches on their physiology and structure. The Annales d'Histoire Naturelle, and the Mémoires du Muséum, contain a series of his memoirs on zoological subjects of great value and interest, and his work "*Sur les Dens des Mammifères considerées comme Caractères Zoologiques*," is full of novel and original views and observations, and has always been considered as one of the most valuable contributions to the science of Zoology which has been made in later times: the great work "*Sur l'Histoire des Mammifères*," of which seventy numbers have been published, was undertaken in conjunction with Geoffroy St. Hilaire, and is the most considerable and most extensive publication on Zoology which has appeared since the time of Buffon. He was likewise the author of many other works and memoirs on zoological subjects in various scientific journals and collections.

M. F. Cuvier, like his celebrated relative, combined a remarkable dignity and elevation of character, with the most affectionate temper and disposition. Like him, too, his acquisitions were not confined to his professional pursuits, but comprehended a very exten-

sive range of literature and science. In his capacity of inspector of the university, he devoted himself with extraordinary zeal to the improvement of the national education of France in all its departments, from the highest to the lowest. It was in the course of one of his tours of inspection that he was attacked at Strasburg with paralysis; the same disease which, under similar circumstances, had proved fatal to his brother, and likewise in the same year of his age.

Dr. Martin van Marum was secretary to the Batavian Society of Sciences at Haarlem, and superintended the publication of their Transactions for many years. He was also director of the Teylerian Museum at the same place, and the noble library of natural history and science which adorns that establishment was chiefly collected by his exertions: it was under his directions also that the great electrical machine belonging to the Teylerian Museum was constructed, and he published in 1795 and 1800 the results of a very extensive series of experiments on the various forms of electrical phenomena which were produced by it, and more particularly with reference to a comparison of its effects with those produced by a powerful voltaic pile, which were undertaken at the express request of Volta himself. Dr. van Marum was remarkable for his very various acquirements, and was the author of many memoirs in the Haarlem and other Transactions, on botanical, chemical, physical, and other subjects: he was a man of the most simple habits and of the most amiable character, and devoted himself most zealously during the greatest part of a very long life to the cultivation of science, and to the promotion of the interests of the establishment over which he presided.

Gentlemen, I have now arrived at the last and most painful part of my duty in addressing you, which is most gratefully and most respectfully to bid you farewell.

On the motion of Mr. Davies Gilbert, seconded by Mr. Hatchett, it was unanimously resolved that the cordial thanks of the Society be presented to His Royal Highness the Duke of Sussex for the numerous and valuable services which he has rendered the Society during the period of his filling the office of their President.

The following Report of the Council respecting the awards they have made of two Copley Medals, two Royal Medals, and one Rumford Medal, was read.

The Council have awarded a Copley Medal to Professor Gauss, for his researches and mathematical researches on Magnetism.

Professor Gauss's labours on the subject of magnetism, published at various periods, and continued with increasing activity up to the present time, have given to our knowledge of that subject very valuable and striking additions. In his dissertation entitled, "Intensitas vis magneticæ terristris at mensuram absolutam revocata," (Göttingen, 1833,) he showed how, by a skilful combination of experiment with mathematical calculation, several of the most difficult

problems belonging to the subject may be solved; namely, the determination of the magnetic axis of a needle; the exact determination of the moment of inertia of an oscillating needle; the deviation produced in the direction of the horizontal needle by the neighbourhood of a magnet; and the determination of the absolute intensity of the horizontal magnetic force of the earth. A combination of magnetic observers in different places had been set on foot by M. von Humboldt in 1828; a magnetic observatory was erected at Göttingen in 1833; and in consequence of these circumstances the curious discovery was made in 1834, that the minute momentary changes in the position of the horizontal needle are simultaneous and corresponding at distant places. This led M. Gauss to direct the attention of men of science more particularly to this subject; and the operations of the "Magnetic Union" of observers were carried on with great activity under his guidance. The "Results of the Observations of the Magnetic Union" for 1836 and for 1837, published by MM. Gauss and W. Weber, contain an account of the consequences of these exertions. They also contain descriptions of instruments invented by M. Gauss for the purpose of these observations, namely, the *magnetometer*, and other magnetical apparatus of his construction, which has already been sent to the observatories of Bonn, Dublin, Freiberg, Greenwich, Kasan, Milan, Munich, Naples, Upsala, Krakow, Leipzig, and Marpurg. Also the *Bifilar Magnetometer*, which determines directly the variation of horizontal intensity. The "Results" further contain various mathematical calculations of great importance, on the subject of the above instruments, and of the observations made by them. And it appears by observations made in March, 1838, at Göttingen and three other places, with the Bifilar apparatus, that there is the same correspondence in the simultaneous changes of intensity at different places which had already been discovered in the declination. The ingenuity shown in the invention of instruments and processes, the mathematical skill employed in treating the observations, and the importance and interest of the results, are well deserving of being honourably marked by the Royal Society, and the adjudication of the Copley Medal to M. Gauss.

The Council have also awarded a Copley Medal to Dr. Faraday for his discovery of Specific Electrical Induction, published in the eleventh series of his Experimental Researches in Electricity.

From the peculiar view which he had taken of the phenomena of induction, Dr. Faraday was led to expect some particular relation of this process to different kinds of matter, through which it might be exerted. This relation he succeeded in establishing by the most decisive experiments.

The phenomena are shown in their simplest form by an instrument which he has named a Differential Inductometer. It consists of three insulated metallic plates, placed facing each other; the centre one being fixed, and the other two moveable upon slides, by which they may be approximated to or withdrawn from the centre.

Each end plate is connected with an insulated leaf of an electrometer. When a charge is communicated to the centre plate under ordinary circumstances, the induction is equal on both sides, and the gold leaves are not disturbed. But if after uninsulating them, and again insulating them, a thick plate of shell-lac or sulphur be interposed between two of the plates, unequal induction will take place on the two sides, and the gold leaves will attract one another. By these means Dr. Faraday ascertained that, taking the specific inductive capacity of air to be . . . . . 1·

That of Glass is	1·76
Shell-lac	2·
Sulphur	2·24

The results obtained with spermaceti, oil of turpentine, and naphtha were higher than that of air, but their conducting powers interfered with the accuracy of the experiments.

By another form of apparatus he ascertained that all aëriform matter has the same power of sustaining induction; and that no variations in the density or elasticity of gases produced any variation in their electric tension until rarefaction is pushed so far as that discharge may take place across them.

Hot and cold air were compared together, and damp and dry air, but no difference was found in the results.

The great importance of the discovery and complete establishment of such a principle as that of specific inductive capacity, in all its relations both experimental and theoretic, is so palpable, that any comment must be superfluous; and the Council have felt they cannot better mark their sense of the value of this discovery than by awarding the Copley Medal to its author.

The Council have awarded the Royal Medal for Mathematics to H. F. Talbot, Esq., for his two memoirs entitled, "Researches in the Integral Calculus," published in the Philosophical Transactions for 1836 and 1837.

Nothing perhaps tends more directly to bring the correctness of refined theoretical investigations in physics to the test of numerical results, than improvements in and extensions of the processes of integration. Any advance therefore which is made in this difficult branch of analysis must be viewed not merely in the light of a difficulty overcome in the progress of abstract science, but likewise as having an important bearing on the advancement of physical inquiry.

The branch of analysis to which Mr. Talbot's researches belong is one which is connected with a long series of valuable investigations from the time of Fagnani and Euler to that of Legendre, Jacobi, and Abel: it relates to integrals under the same form which are separately nonscendental, but which furnish, under particular conditions of the variables, an algebraical result when two or more of them are connected together with the signs + or −. The celebrated theorem of Abel, which may be made to comprehend some of Mr. Talbot's results, is the most comprehensive and most important of all the general conclusions which have been arrived at in this de-

partment of analysis: but the process adopted by Mr. Talbot is more allied to that followed by Fagnani than by Abel, and is equally remarkable for its great simplicity and for the vast number of novel and interesting results which it furnishes, including not merely several of the most remarkable of those which are already known, but likewise many others which are apparently not deducible by other methods.

The Council have awarded the Royal Medal for Chemistry to Professor Thomas Graham for his paper entitled "Inquiries respecting the Constitution of Salts; of Oxalates, Nitrates, Phosphates, Sulphates, and Chlorides," which was read to the Society on the 24th of November 1836, and since published in the Philosophical Transactions. This paper they have considered as being the last of a series on a general subject of great importance: and as the sequel of Professor Graham's researches on the Arseniates, Phosphates, and modifications of Phosphoric Acid, read to the Society on the 19th of June 1833, and published in the Philosophical Transactions of the same year. He has therein shown that, by considering the water which enters into the composition of the different classes of salts, which the phosphoric acid forms with the several bases, and which has been considered as water of crystallization as standing in a *basic* relation to the acid, a very simple view might be taken of this very complicated subject. According to this theory, there are three sets of phosphates, in which the oxygen of the acid being 5, the oxygen in the base is respectively 3, 2, or 1; the remaining equivalents of oxygen, in the two first cases, being supplied by that portion which exists in the 2 or 3 equivalents, respectively, of the basic water, which water is wholly absent in the third case. These three classes of salts Professor Graham proposes to term, respectively, *monobasic*, *bibasic*, and *tribasic* salts. Professor Graham has extended these views of the basic formation of water in salts to the case of the sulphates, in a paper communicated to the Royal Society of Edinburgh, and published in the 13th volume of their Transactions, on "Water as a constituent of Salts." The principal object of this paper, however, was to show that water exists in a different state in certain salts, and does not exercise a true basic function, being capable of being replaced by a *salt*, and not by an *alkaline base*, and giving rise to a class of *double salts*. This inquiry was suggested by the tendency of phosphate of soda to unite with an additional dose of soda, and form a *subsalt*, which had been traced to the existence of basic water in the former. The result was, that in the well-known class of sulphates, consisting of sulphates of magnesia, zinc, iron, manganese, copper, nickel and cobalt, all of which crystallize with either five or seven equivalents of water, one equivalent proved to be much more strongly united to the salt than the other four or six. The latter, to which the name of *water of crystallization* should be restricted, may generally be expelled by a heat under the boiling point of water; while the remaining equivalent uniformly requires a heat above 400° of Fahrenheit for its expul-

sion, and seems to be, in a manner, essential to the salt. Thus in the double sulphate of zinc and potassa, the single equivalent of water, existing in the sulphate of zinc, is replaced by an equivalent of sulphate of potassa, while the six equivalents of water of crystallization remain; and all the other salts of this class combine with one another in a similar manner.

The super-sulphates must also be regarded as analogous to double salts; the bisulphate of potassa, for example, being a sulphate of water and potassa.

There is likewise a provision in the constitution of hydriated sulphuric acid for the production of a double salt analogous in its constitution to sulphate of zinc. Sulphuric acid, of the specific gravity 1·78, contains two equivalents of water, and is capable of crystallizing at a temperature of 40° of Fahrenheit, being, in fact, the only known crystallizable hydrate of sulphuric acid. The second equivalent of water, contained in the hydrated acid, is capable of being replaced by an equivalent of sulphate of potassa, which is itself a salt, and a bisulphate of potassa is the result of this substitution. But the first equivalent of water can be replaced only by an alkali, or true base. Professor Graham distinguishes water in these two states of combination as *basic* and *saline* water. Thus the hydrate of sulphuric acid, already mentioned, contains one equivalent of basic, and one equivalent of saline water. It is, in his nomenclature, a *sulphate of water with saline water*, as the hydrous sulphate of zinc is a *sulphate of zinc with saline water*. The bi-sulphate of potassa is also a *sulphate of water with sulphate of potassa*, and corresponds with the double salt of sulphate of zinc with sulphate of potassa.

The results which Professor Graham has thus obtained, and which he has communicated, partly to the Royal Society, and partly to the Royal Society of Edinburgh, suggested to him the probability that the law with respect to water in the constitution of the sulphates would extend to any hydrated acid, and the magnesian salt of that acid; and his researches on this extension of the subject constitute the substance of his last communication to the Royal Society. As he had already found that the sulphate of water is constituted like the sulphate of magnesia, so he now finds oxalate of water to resemble the oxalate of magnesia, and the nitrate of water to resemble the nitrate of magnesia. He is moreover of opinion, that this correspondence between water and the magnesian class of oxides extends beyond their character as bases, and that, in certain subsalts of this class, the metallic oxide replaces the water of crystallization of the neutral salt, and discharges a function which was thought peculiar to water.

The same kind of displacement, which takes place in the formation of a double sulphate by the substitution of a salt of the same class for an equivalent of water, appears to occur likewise in the constitution of double oxalates; and the application of this principle elucidates the constitution of that class of salts, as well as of the super-oxalates, and to explain the mode in which they are derived.

Lastly, the same law is traced in the constitution of the chlorides of the magnesian class of metals, which are found to have two equivalents of water strongly attached to them, and which may therefore be considered as constitutional. Many of them have two or four equivalents more, the proportion advancing by multiples of two equivalents.

Professor Graham has supported these views, not only by numerous arguments, but also by experimental investigations of the physical properties of different classes of salts, and a great number of chemical analyses; and he has thus largely added to our positive knowledge of this somewhat neglected branch of chemical science.

The Council, without pronouncing any judgement on the question whether Professor Graham's hypothesis concerning the different functions of water in the constitution of salts be a representation of the real mechanism of nature, are of opinion, that the discussion of his new and ingenious views will be highly conducive to the progress of science, particularly in the department of organic chemistry, in which they have been already followed out with success by some eminent foreign chemists, and have accordingly awarded to Professor Graham the Royal Medal for Chemistry of the present year, for his valuable researches in this department of science.

The Council have awarded the Rumford Medal to Professor Forbes, for his discoveries and investigations of the Polarization and Double Refraction of Heat, published in the recent volumes of the Transactions of the Royal Society of Edinburgh.

That solar heat, like the light which it accompanies, may be polarized, was shown by the early experiments of MM. Malus and Berard; but the announcement of M. Berard, that heat from other sources was also capable of polarization, not having been confirmed in subsequent repetitions of his experiments by other philosophers, it became of the highest importance to establish this analogy between light and heat from whatever source the latter might be derived.

The admirable instrument, the Thermo-multiplier, invented by MM. Nobili and Melloni, afforded facilities for the prosecution of inquiries of this nature, of which the inventors and others were not tardy in availing themselves. One of the most important results obtained by M. Melloni, and confirmed by Professor Forbes, the refrangibility of non-luminous heat by a prism of rock-salt, appeared to point to the polarization and double refraction of heat as almost necessary consequences. The experiments, however, of both these philosophers with tourmaline, undertaken nearly at the same time, appeared to negative the fact; but Professor Forbes becoming sensible of the source of error, in the conclusions he had at first drawn from his experiments, soon saw that his results clearly indicated the effect he was in search of. His subsequent experiments established the fact, that in the transmission of heat from an Argand lamp, from incandescent platinum, and even from non-luminous heated brass, through slices of tourmaline cut parallel to the axis of the crystal,

a portion of the heat is polarized, when the axes of the crystals are at right angles to each other; and these results were confirmed by M. Melloni.

But Professor Forbes did not allow the polarization of heat to rest solely upon the results obtained with tourmaline. By employing bundles of plates of mica, and adjusting them at proper angles, he not only obtained much more decisive results, particularly with heat from a non-luminous source, but such results as go to establish the singular fact, that the degree of the polarization of heat is dependent on the nature of its source. He has further shown the depolarization of heat by the interposition of a mica plate, and its circular polarization by means of two total internal reflections in an interposed rhomb, or two prisms of rock-salt.

The Council consider that they cannot better testify their estimation of the discoveries and experimental investigations of Professor Forbes, than by awarding to him a Medal, bequeathed by its distinguished founder, as a premium to the author of discoveries tending to improve the theories of heat and light.

The Statutes relating to the Election of Council and Officers having been read from the Chair, and the Rev. P. Jennings, D.D., and Joseph Smith, Esq., having, with the consent of the Society, been nominated Scrutators, to assist the Secretaries in examining the lists, the votes of the Fellows present were collected.

The Scrutators reported the result of the ballot to be as follows:

President.—The Marquis of Northampton.

Treasurer.—John William Lubbock, Esq., M.A., V.P.

Secretaries.—Peter Mark Roget, M.D.; Samuel Hunter Christie, Esq., M.A.

Foreign Secretary.—William Henry Smyth, Capt. R.N.

Other Members of the Council.—H.R.H. the Duke of Sussex, K.G., V.P.; Francis Baily, Esq., V.P.; John George Children, Esq., V.P.; John Frederic Daniell, Esq.; C. G. B. Daubeny, M.D.; Thomas Galloway, Esq., M.A.; Thomas Graham, Esq.; Sir John F. W. Herschel, Bart., M.A., V.P.; Francis Kiernan, Esq.; George Rennie, Esq.; John Forbes Royle, M.D., V.P.; Rev. Adam Sedgwick, M.A.; Robert Bentley Todd, M.D.; Charles Wheatstone, Esq.; Rev. William Whewell, M.A.; Rev. Robert Willis, M.A.

Whereupon the above-named gentlemen were declared duly elected; and thanks were voted to the Scrutators for their trouble on this occasion.

The following is the statement with respect to the Receipts and Payments of the Society during the preceding year, which was laid on the table by the Treasurer.

Statement of the Receipts and Payments of the Royal Society between Nov. 29, 1837, and Nov. 29, 1838.

RECEIPTS.

	£.	s.	d.	£.	s.	d.
Balance in the hands of the Treasurer at the last Audit ..				337	3	8
32 Weekly Contributions, at one shilling				83	4	0
136 Quarterly Contributions, at £1				516	0	0
32 Admission Fees				320	0	0
9 Compositions for Annual Payments at £60.				540	0	0
Rents:—						
One year's rent of estate at Mablethorpe: due at Michaelmas, (less the expenses of defending the Tythe suit, £55 13 3)	51	6	9			
One year's rent of lands at Acton: due at Michaelmas	60	0	0			
One year's fee-farm rent of lands in Sussex; land-tax deducted: due at Michaelmas ..	19	4	0			
One fifth of the clear rent of an estate at Lambeth Hill, from the Royal College of Physicians, in pursuance of Lady Sadleir's will: due at Midsummer.....	3	0	0			
				133	10	9
Dividends on Stock:—						
One year's dividend on £14,000 Reduced 3 per cent. Annuities	420	0	0			
Dividend on £3452. 1. 1 Consols, the produce of the sale of the premises in Coleman-street.....	103	11	2			
One year's dividend on £200 Consols	6	0	0			
Donation Fund.						
One year's dividend on £4150. 0. 0 Consols	124	10	0			
Rumford Fund.						
One year's dividend on £2161. 0. 10 Consols	64	16	6			
Fairchild Fund.						
One year's dividend on £100 New South Sea Annuities	3	0	0			
				721	17	8
Miscellaneous Receipts:—						
Sale of Philosophical Transactions and Abstracts of Papers.....				287	2	6
Total Receipts				£2938	18	7

PAYMENTS.

	£.	s.	d.
Fairchild Lecture.—The Rev. J. J. Ellis, for delivering the Fairchild Lecture for 1837	3	0	0
Ditto ditto for 1838	3	0	0
Bakerian Lecture.—James Ivory, Esq., for the Bakerian Lecture	4	0	0
Copley Medal.—Mr. Wyon for Eight Medals	42	16	0
British Museum Fund. Baillière for Books	24	10	0
———— Simpkin and Marshall for ditto	16	19	0
	94	5	0

Salaries:—	£.	s.	d.			
Dr. Roget, one year, as Secretary	105	0	0			
S. H. Christie, Esq., one year, as Secretary	105	0	0			
Ditto for Index to Phil. Trans.	5	5	0			
Capt. Smyth, one year, as Foreign Secretary	20	0	0			
Mr. Roberton, one year, as Assistant-Secretary	160	0	0			
Mr. W. E. Shuckard, one year, as Librarian	50	0	0			
Mr. Holtzer, one year, as Porter	30	0	0			
Ditto, for extra Porterage	10	0	0			
				485	5	0
Fire Insurance, on the Society's Property				22	11	6
Mrs. Coppard: Gratuity				10	0	0
Bills:—						
Taylor:						
Printing the Phil. Trans., 1837, part 2	177	2	9			
Ditto, 1838, part 1; Proceedings, Nos. 30—33; Circulars, Lists of Fellows, Ballot-lists, Statement of Payments, and Minutes of Council; &c. &c.	184	16	6			
Bowles and Gardiner:						
For Paper for the Phil. Trans., 1838, part 1	56	5	0			
Basire:						
For Engraving and Copper-plate Printing for Phil. Trans., 1838, part 1	27	18	6			
Walker:						
Engraving and Copper-plate Printing for the Phil. Trans., 1837, parts 1 and 2	119	0	0			
Gyde:						
Sewing and Boarding 800 Parts of Phil. Trans. 1837, part 2	27	8	0			
Ditto, 1838, part 1	27	6	8			
				619	17	5
Carried forward				£1231	18	11

	£.	s.	d.	£.	s.	d.
Brought forward..				1231	18	11
Ackermann :—For Emblazoned Leaf for the Queen's signature	5	5	0			
Chappell :—For Stationery	23	2	6			
Saunderson :—For Shipping Expenses	5	1	9			
Brecknell and Turner :—For Wax Lights, Candles, and Lamp Oil	36	6	6			
Bramah :—For Secretary's Box	3	14	6			
Cubitt :—For Repairing Windows, Carpets, &c.	12	1	3			
Gwillim :—For Brushes, Fire wood, &c.	4	10	2			
Exchequer Fee for paying dividend	0	13	0			
Wood :—For Coals	3	0	0			
Murray :—For taking Meteorological Observations	7	0	0			
Tuckett :—Binding Charters and Statutes for the Queen	2	16	0			
				103	10	8
Taxes and Parish Rates :						
Land and Assessed Taxes	35	3	9			
Poor Rate	15	11	8			
Church Rate	3	11	8			
Rector's Rate	1	16	3			
				56	3	4
Petty Charges :						
Window-cleaning, &c.	2	12	0			
Attending Clocks	1	11	6			
Postage and Carriage	17	0	0			
Expenses on Foreign Packets, &c.	8	16	3			
Stamps	3	3	6			
Charwoman's Wages	27	6	0			
Extra Charwoman's work	2	4	0			
Miscellaneous expenses	20	18	0			
				83	11	3
Total Payments....				£1475	4	2
Balance in the hands of the Bankers	1467	14	5			
Overpaid by Mr. Roberton	4	0	0			
Balance in the hands of the Treasurer				1463	14	5
				£2938	18	7

November 29th, 1838.

FRANCIS BAILY, *Treasurer.*

The Balances in hand, now belonging to the several trusts, are as under: viz:—

	£.	s.	d.
British Museum Fund	203	14	4
Donation Fund	233	16	4
Rumford Fund	259	6	6

The following table shows the progress and present state of the Society, with respect to the number of Fellows:

	Patron and Honorary.	Foreign.	Having compounded.	Paying £2. 12. Annually.	Paying £4 Annually.	Total.
November, 1837	10	48	574	32	124	788
Since elected	1		7		23	31
Since re-instated			1		2	3
Since compounded			+ 2		— 2	
Since deceased, &c.		—4	—23	—3	— 1	—31
Defaulters					— 2	— 2
November, 1838	11	44	561	29	144	789